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Analysis of military contracting procedures.

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ANNALYSIS OF MILITARY CONTRACTING PROCEDURES

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PREFACE

Nearly one-third of the annual budget of the Department of Defense is spent for the research, development, and production of weapons systems. All but a very small fraction of these activities are carried out by private industry under contract with the government. Over the years this contractual relationship has given birth to the so-called defense industry--an industry which in 1963 accounted for 3 per cent of the gross national product.

No other industry is subject to as much governmental control as is the defense industry. These controls stem from many different motives. Some are designed to protect the public purse from being drained by payments of excessive or fraudulent profits. Others have as their purpose the furtherance of social or economic objectives. Still others are concerned with providing contractors with incentives to improve their performance.

Each of these controls, if examined separately from the environment in which they function, appears to further the public interest. This paper, however, focuses on the entire contractual environment and the resultant interaction of these various control devices. This total picture is quite different. The conflicts that exist among these controls often breed inefficiency and many of the objectives sought to be accomplished

through them are in fact unattainable because of them.

The general subject matter of government contracting procedures has never before been the topic of research by members of the Navy Graduate Financial Management Program. In view of the large portion of the Navy budget that is spent on procurement of weapon systems, it is difficult to understand this lack of interest. If this paper serves no other purpose than to kindle the desire of some future student to study the subject in depth, then the effort expended in researching and writing it has been worthwhile.

A wider knowledge by responsible officers of how the government procures its weapons system should eventually lead to more efficient procedures and, concomitantly, to improved readiness.

TABLE OF CONTENTS

TABLE OF CONTENTS--Continued

LIST OF TABLES

CHAPTER I

MILITARY PROCUREMENT: LAW AND REGULATION

Historical Background

The statutory basis governing all peacetime military procurement is the Armed Services Procurement Act of 1947 as amended.[1] This law was a radical departure from the pre-war procurement legislation and was based on the experience gained during World War II.

Prior to 1939, the laws controlling the procurement actions of the War and Navy Departments were a tangled net of confusing and often conflicting statutes. The general rule permeating all of these legislative pronouncements was the requirement for assuring maximum competition on the part of suppliers. Government agencies were enjoined to formally and extensively advertise their supply and material needs. Prospective vendors submitted sealed bids and the contract was awarded to the lowest responsible bidder. The Congress believed this method of procurement the best means of getting the maximum return for each dollar spent while simultaneously awarding contracts impartially among vendors and minimizing opportunities for fraud.

The few exceptions to this rule were often the results of pressure brought to bear by special interest groups or the exigencies of a specific

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[1] U. S., 10 United States Code, secs. 2301-2314

situation, and were not conducive to encouraging efficiency and economy of operations.

As the spectre of war arose in Europe, Congress became aware that many of its laws severely hampered efforts to prepare this country to meet the aggressive actions of other nations. Initially it acted timidly to loosen the bonds of restrictive peacetime procurement laws. By the Public Works Act of April 25, 1939, it authorized the Secretary of the Navy to negotiate a cost-plus-fixed-fee contract for the construction of public works outside the United States.[1] Procurement by negotiation offered contracting officers considerable discretion in selecting and dealing with suppliers, giving them an authority which heretofore had been severely restricted. The authorization, however, was subject to several limitations: (1) negotiations were to take place among a minimum of three qualified contractors; (2) the fee could not exceed 10 per cent of the estimated cost; (3) the President's personal approval of the contract was required; and (4) a naval officer was required to participate in the board of directors meetings in order to safeguard the interests of the United States. Restrictive as this legislation was, it marked the turning point toward more efficient procurement policies.

Congress, recognizing that a broad industrial base in the aircraft industry was necessary to meet wartime requirements, next passed the

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[1] U. S., 53 Statutes 590 (1939).

"Multiple Awards Act."[1] This Act authorized the Secretaries of the War and Navy Departments to award contracts for the production of aircraft and aircraft parts not only to the lowest responsible bidder, but to the three lowest bidders--thus creating a potential for rapid expansion.

The so-called Speed-up Act followed in 1940.[2] This empowered the President, when he deemed it in the national interest, to authorize the Secretary of the Navy to negotiate contracts for the procurement, repair, or alteration of ships and aircraft, disregarding the existing requirements of competitive bidding. Furthermore, it gave the President the power to authorize the Secretary to make advance payments of up to 30 per cent of the contract price to the contractors.

In December, 1941, with the United States entry into the war, the Congress removed the remaining restrictions on procurement by drafting the First War Powers Act. The President signed it into law on December 18, 1941.[3] Under Title II of this Act, the President could authorize any agency of the government engaged in the war effort:

> . . . to enter into contracts and into amendments and modifications of contracts heretofore or hereafter made and to make advance progress and other payments thereon, without regard to the provision of law relating to the making, performance, amendment or modification of contracts, whenever he deems such action would facilitate the prosecution of the war.

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[1] U. S., 54 Statutes 45 (1939). [2] U. S., 54 Statutes 676 (1940).

[3] U. S., 55 Statutes 839 (1941)

The President granted this authority to the military services by Executive Order 9001. The few limitations imposed were of a public policy nature and did not reflect any lack of confidence in the ability, judgment, or integrity of the services. Without question, this Act provided immeasurable assistance in the successful conclusion of the war.

Two important lessons were learned by the government in functioning under the First War Powers Act. First, negotiated contracts proved not only invaluable in broadening the base of industrial production so essential to the successful waging of war, but they also offered other benefits which aided both efficiency and economy during wartime operations. Secondly, the military were capable of sound judgment and business sense in exercising the broad procurement powers extended to them.

After the cessation of hostilities, the continuing state of world tension dictated the maintenance of a large military force at a high level of readiness. A return to the inflexible pre-war procurement policies would have been a detriment to military preparedness.

The Armed Services Procurement Act

In January, 1947, the Armed Services Procurement Bill was introduced into Congress. Its purposes were to place all military peacetime procurement under one statute, thereby providing for coordination and uniformity of practice among the services; to eliminate archaic laws that prevented efficiency and economy; and to provide the armed services with sufficient flexibility in meeting their procurement needs. The bill, after

more than a year of hearings conducted by the Armed Services Committees of both the House of Representatives and the Senate, was passed and signed into law by the President on February 19, 1948.

The Act reaffirmed formal advertising as the normal peacetime procurement method. It provided, however, for procurement by negotiation where experience proved it was a superior or necessary means of obtaining supplies or services. Specifically, the Act, after several amendments, now cites 17 circumstances under which negotiation is permissible. In brief, these are:

1. If determined to be necessary during periods of national emergency
2. If the public exigency will not admit of the delay incident to advertising
3. If the contract price does not exceed $2,500
4. If the contract is for personal or professional services
5. If the contract is for service to be rendered by an educational institution
6. If the supplies or services are purchased and used outside the United States
7. If the contract is for medical supplies
8. If the supplies to be purchased are for resale
9. If the contract is for perishable foods

10. If the contract is for supplies or services for which it is impossible to secure competition

11. If the contract is for experimental, research, or development work

12. Where the contract involves security classifications

13. Where standardization of equipment and interchangeability of parts are determined necessary

14. For technical or special property requiring a substantial initial investment or an extended time period preparatory to manufacture and it is determined that formal advertising would result in additional cost to the government or an unacceptable delay of procurement

15. Where bids received under formal advertising are unreasonable or evidence collusion among competitors

16. Where a specific supplier must be kept available because of a national emergency or in the interest of industrial mobilization

17. If otherwise authorized by specific laws or statutes.

These provisions of the Act are its most important features, since they provide the military with a reasonable degree of flexibility in conducting procurement functions. This power to negotiate has been and is a major factor in the development of complex weapons systems.

The Renegotiation Act of 1951, as Amended[1]

In an effort to eliminate excessive profits from contracts or subcontracts with the military and other specified government departments, the Congress passed an Act in 1951 establishing the Renegotiation Board. This Board, an independent executive agency, determines on an annual basis, in accordance with rather broad statutory criteria, what profits earned under contracts and subcontracts subject to the Act are considered to be excessive, and orders them refunded to the government. Appeals from the decisions of the Board may be made to the United States Tax Court.

Other Acts

The laws directly or indirectly relating to procurement by the military are too many for enumeration here and most are beyond the scope of this paper. The following are some of the more important ones, with a brief explanation of their relation to procurement:

Public Law 85-804.[2] -- This Act governs procurement during periods of national emergency. It contains many of the provisions of Title II of the First War Powers Act.

The Walsh Healey Public Contracts Act.[3] --This Act restricts contracts from being awarded to contractors other than those normally

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[1] U.S., 50 United States Code, secs. 1211-1233.

[2] U.S., 72 Statutes 972.

[3] U.S., 41 United States Code, sec. 35-45.

[illegible]

[illegible]

[illegible]

engaged in providing the materials sought. It requires payment of certain minimum wages to employees and safe working conditions, and prohibits employment of children and convicts.

The Eight-Hour Law of 1912, as Amended.[1]--This Act requires payment of overtime wages to the contractor's employees working beyond eight hours a day.

The Anti-Kickback Acts.[2]--These acts prohibit the inducing of payments from employees or subcontractors as a condition for employment.

The Buy American Act, as Amended.[3]--This Act requires all materials purchased under government contracts to be of United States origin unless such requirement is inconsistent with the public interest.

The Small Business Act of 1958.[4]--This Act states that it is the policy of the government to provide small businesses with a fair share of government contracts and subcontracts, and requires that prime consideration be given small business companies located in labor surplus areas.

The Hebert Act of 1962.[5]--The most important features of this Act are: (1) Those contractors and subcontractors subject to its provisions must

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[1]U. S., 40 United States Code, sec. 321-325.

[2]U. S., 18 United States Code 874; 40 United States Code 276C; 41 United States Code, secs. 51-54.

[3]U. S., 41 United States Code, secs. 10a-10d.

[4]U. S., 15 United States Code, secs. 631-647.

[5]U. S., 10 United States Code, sec. 2306(F).

engaged in executing the contract [illegible]. It [illegible] [illegible] [illegible] [illegible], [illegible] development of [illegible].

The Davis-Bacon Act of 1931, as amended.[1]--This law [illegible] [illegible] [illegible] [illegible].

The Copeland "Anti-Kickback" Acts.[2]--These acts [illegible] [illegible] [illegible].

Eight Hour [illegible] as amended.[3]--[illegible] [illegible] United States [illegible] [illegible].

The Small Business Act of 1953.[4]--[illegible] of the government to [illegible] small business [illegible] [illegible] [illegible] [illegible].

The Miller Act of 1935.[5]--The [illegible] [illegible] of [illegible] are: (1) [illegible]

[1]U.S., 40 United States Code, sec. [illegible].

[2]U.S., 40 United States Code [illegible], 18 United States Code [illegible], 40 United States Code, secs. [illegible].

[3]U.S., 40 United States Code, secs. [illegible].

[4]U.S., 15 United States Code, secs. [illegible].

[5]U.S., 40 United States Code, sec. [illegible].

certify the accuracy, currency, and completeness of their cost or pricing data; (2) it permits an adjustment to the contract price in those cases where the price was significantly increased because of the inaccuracy, incompleteness, or noncurrency of the data.

The Armed Services Procurement Regulation

The Armed Services Procurement Regulation (ASPR) establishes for the Department of Defense uniform policies for carrying out the provisions of the Armed Services Procurement Act and establishes policies for those areas of procurement not covered by the Act. It embraces all aspects of the procurement process and applies to all purchases and contracts made by the Department of Defense for the procurement of supplies or services which obligate appropriated funds, the sole exception being transportation services.

Revisions and additions are drafted by a committee consisting of representatives of the military services. Normally, industry representatives are consulted prior to making any changes.

Procurement Directives

Procurement directives are issued by the military services to disseminate:

1. Internal procurement management instructions.
2. Procurement instructions for specialized commodity areas not specifically covered by ASPR.
3. Interim procurement instructions essential to procurement operations. These must be promptly submitted

to the ASPR committee.

4. Material determined by the ASPR committee to be inappropriate for ASPR coverage and approved for inclusion in military department directives.

Formal Advertising

As the term "formal advertising" indicates, it is a method of procurement requiring the use of formal and legalistic procedures. Under this method the requirements are delineated and qualified vendors are invited to make bids. The requirements are fully publicized by posting in public places and newspaper advertisements. Those interested submit sealed bids which are publicly opened on the specified date and the contract is awarded to the responsible bidder whose bid is most advantageous to the government considering both price and other factors.

The effectiveness of formal advertising as a method of procurement is dependent upon: (1) an adequate number of qualified bidders; (2) fully competitive pricing on the part of the bidders; (3) definitive supply or material requirements which may be published; and (4) the availability of time for advertisement and receipt and opening of bids.

Two-step formal advertising. --This procurement method is comparatively new, being first employed in 1960. The first step consists of the request, submission, and evaluation of a technical proposal without regard to price. The second phase is the formally advertised procurement, confined to those who initially submitted an acceptable proposal.

Negotiation

Negotiation may be broadly defined as all contracting and purchasing not made by formal advertising. Under conditions previously enumerated, it offers the government considerable discretion in selecting and bargaining with vendors. It does not preclude competition, but rather offers the benefits of competition on an informal basis. Where the conditions necessary for formal advertising are not met, negotiation substitutes an adequate cost and price analysis of potential contractors' proposals to obtain the materials or services needed at fair and reasonable prices.

Negotiation is a valuable tool for planning the fulfillment of future needs. Dependable sources of supply can be developed through selected placement of contracts. Likewise, competition may be fostered in those products for which the military agency presently depends on a single source of supply. Training contracts, which familiarize a manufacturer in the production of critical wartime items, may also be awarded, thereby facilitating industrial mobilization.

The objective of procurement by negotiation is identical to that of formal advertising--to meet military procurement requirements on the best available terms. Successful negotiation, unlike formal advertising, is not solely dependent on the interaction of competitive forces, but rather on the knowledge, ability, judgment, and experience of government procurement personnel.

CHAPTER II

CONTRACT TYPES

The contract is the chief administrative vehicle by which the government procures its necessary supplies, services, and weapons systems from private industry. The wide variety of items procured, the high unit dollar value of many, and the frequent novelty which requires marked advances in the state of the art necessitate a wide range of contract types to properly balance the public interests with private commercial interests.

The purpose of this chapter is to enumerate and explain the contract types used in procurement actions subject to the Armed Services Procurement Act and to point out some of the major considerations which influence contract selection. In addition, the monetary incentives offered to the contractors under each type will be discussed.

The Armed Services Procurement Regulation groups the various contract types into two main classes based on their compensation features. These are: (1) fixed-price contracts and (2) cost-reimbursement contracts. In order to facilitate the explanation of the various contracts, this classification will be followed.

Fixed-Price Contracts

Firm Fixed-Price Contracts (FFP)

This contract type provides for a price that is not subject to adjustment by reason of the cost experience of the contractor during performance of the contract. Depending on specific contract provisions, either a fixed sum of money per unit delivered or a fixed dollar lump-sum payment upon total contract completion is paid to the contractor.

Such a contract is appropriate where reasonably definite specifications are available and where there exists a highly reliable basis for pricing. It is generally used in the procurement of standard commercial items or those military items for which accurate production and cost information is available.

Modified Fixed-Price Contracts

The two conditions appropriate for an FFP contract do not always remain static, particularly when the procurement is spread out over a long time period. Specifications and costs are always subject to change in the long run and therefore it is appropriate to provide for price adjustments under certain conditions. These modified fixed-price contracts will now be discussed.

Fixed-Price with Provisions for Escalation

Included in this fixed-price contract are provisions for the adjustment, either upward or downward, of the contract price upon the occurrence

of specified contingencies. Generally a reasonable ceiling is imposed on any price increase but there is no floor limiting downward price adjustments.[1]

Escalation provisions take into account, for example, the possibility of increased costs resulting from wage negotiations or a rise in material prices during the term of the contract. Where there is a probability of such an increase in costs, the contractor negotiating a firm fixed-price contract would include an allowance for it. The government would be unwilling to accept such an allowance since it is based on a probability, not an actuality.

An important point to note is that escalation provisions do not provide protection to contractors against contingencies arising from their own inaccurate estimates of cost.

Fixed-Price with Provisions for Redetermination (FPR)

Currently there are two types of redetermination clauses[2] which are permitted to be used:

1. Prospective periodic price redetermination at stated intervals (Type A). --Under this contract type, a firm fixed-price is negotiated for the initial period of the contract. It also provides for future price determinations, either upward or downward from the original price at specified intervals during the remaining contract term. The insertion of this clause

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[1] A number of prescribed escalation clauses designed for varying circumstances are stated in ASPR 7-106, 107.

[2] ASPR 3-404.5 - .7 set forth the conditions for use of price redetermination clauses, while ASPR 7-109 states the specific articles which may be used.

[1]

[2]

is appropriate where the contract is for quantity production and it is possible to negotiate fair firm fixed prices for the initial but not any subsequent period. As a matter of practice, the intervals between price redeterminations are generally one year.[1]

2. Retroactive price redetermination after completion (Type E). -- Under this contract type, a price ceiling is established; however, the final price is determined by negotiation after completion of the contract. In practice this is a rarely used contract type since it does not offer any monetary incentive to the contractor to reduce cost below the established ceiling. It is of use only when the contract is for such a small quantity and the time of completion so short that use of Type A redetermination clause is impractical.[2]

Fixed-Price Incentive Contracts (FPIF)

Under this contract type there is initially negotiated a target (expected) cost, a target profit based on the target cost, a price adjustment formula, and a maximum price ceiling. Upon completion of the contract, the final cost is negotiated and the profit determined in accordance with the price adjustment formula.

The incentive lies in the price adjustment formula which increases the contractor's profits as actual costs are decreased below target and

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[1] Gilbert A. Cuneo, Government Contracts Handbook (Washington, D. C.: Machinery and Allied Products Institute and Council for Technological Advancement, 1962), p. 146.

[2] Ibid., p. 147.

decreases his profit as costs increase above target. The formula is so constructed as to provide for sharing between contractor and the government of the benefits of cost reductions and the burden of increased costs. The negotiated maximum price, however, limits the government liability. Table 1 illustrates an FPIF contract with cost control incentives.

The more complex forms of this contract type are those which simultaneously apply monetary incentives to cost, schedule, and product performance, as outlined in a Department of Defense contract guidebook:

> The purpose of combining incentives is obvious. Successful performance of almost any contract consists in completing a satisfactory end item or service at a reasonable cost and within certain time limits. Since all the factors are closely dependent on each other, a contract that places too heavy a premium on one risks loss of control over the other two. It follows, then, that a properly structured multiple-incentive contract should serve two basis purposes. First, it should motivate the contractor to strive for outstanding results in all three incentive areas; in other words, his objective at the outset should be to earn maximum profit, and the contract should be structured so that there is some possibility that he can do this. Second, if it becomes apparent to the contractor that outstanding results cannot be achieved in all areas, the incentive structure should compel decisions as between cost, time, and performance that are in consonance with the overall procurement objectives of the Government. Realization of the first objective depends largely on the range of effectiveness established for each incentive element and the probability of achieving outstanding performance in all incentive areas. Realization of the second purpose, on the other hand, turns mainly on the relative weights assigned to each incentive element, since these weights, along with the separate ranges of incentive effectiveness, will establish the various break-even points for trade-off decisions between cost, schedule, and performance. [1]

This contract type is best used in procurement situations where there can be attached to the target cost, schedule, and performance a relatively

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[1] U. S. Department of Defense, Incentive Contracting Guide (Washington: U. S. Government Printing Office, 1963), p. 47.

[illegible] targets. [illegible] of the benefits [illegible]. [illegible]

Table 1 [illegible].

The [illegible] as indicated in a Department of Defense [illegible]:

> The composite combining procedure is critical. Successful performance of almost any contract consists in combining a satisfactory mix of the elements at a reasonable cost and within the time specified. Since all the factors are closely dependent on each other, a contract that [illegible]. It follows, then, that a properly structured multiple-incentive contract should serve two basic purposes. First, it should motivate the contractor to strive for outstanding results in all of the incentive areas; in other words, his objective at the outset should be to earn [illegible], and the contract should be structured so that there is some possibility that he can do this. Second, if [illegible] cannot be achieved in all areas, the incentive structure should [illegible] between cost, time, and performance [illegible] the overall [illegible] of the Government. [illegible] of the first objective depends largely on the range of effectiveness established for each incentive element and the possibility of achieving outstanding performance in all incentive areas. [illegible] on the relative weights assigned to each incentive element, since these weights, along with the [illegible] of incentive effectiveness, will establish the various break-even points for trade-off decisions between cost, schedule, and performance.[1]

This contract type has been used in [illegible] to the target cost, schedule, and performance [illegible]

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[1] U. S. Department of Defense, Incentive Contracting Guide (Washington: U. S. Government Printing Office, [illegible]), p. [illegible].

TABLE 1

FIXED-PRICE-INCENTIVE-FEE CONTRACT

(Cost Control Incentive)

	Negotiated	
Target Cost	$1,000,000	
Target Profit (7%)	70,000	
Target Price	$1,070,000	
Price Adjustment Formula:	U. S. Govt.: 75%	
	Contractor: 25%	
Price Ceiling (125% of Target Cost)		$1,250,000
Profit Ceiling (12% of Target Cost)		120,000
	Actual	
Actual Cost	$900,000	
Cost Underrun	100,000	
Contractor's Profit Target	70,000	
25% of Cost Underrun	25,000	
Total Profit:	$ 95,000	
Government Cost:		
Actual Contractor's Cost	$900,000	
Contractor's Profit	95,000	
Total Cost to Government:	$995,000	

Note: A cost overrun would require similar calculations; however, this would result in a decrease of the contractor's profit.

high level of confidence; thus, the contractor should assume a significant portion of the responsibility for his overall performance.

Cost Reimbursement Contracts

This major class of contract types provides for the payment to the contractor of all allowable costs incurred in the performance of the contract. Not all costs normally considered ordinary and necessary for the conduct of a business enterprise are determined to be allowable under ASPR.[1] Interest and other financial costs, donations, and advertising expense are examples of costs which are generally unallowable.

The contractor must maintain a cost accounting system which segregates the costs applicable to each contract so that joint costs may be properly allocated among several government contracts and/or commercial contracts. His accounting records are subject to periodic reviews by government auditors to determine the allowability and allocatability of all recorded costs and to uncover any evidence of waste or inefficiency. This type of audit is peculiar to cost reimbursement contracts only and should be differentiated from the post contract audit function performed by the General Accounting Office (GAO). All contracts, regardless of type, are subject to audit by the GAO any time within three years of completion.

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[1] ASPR 15, part 2.

[illegible]

[illegible]

[illegible]

Cost Contract

The estimated total cost arrived at through negotiation establishes the price ceiling which cannot be exceeded without prior government approval. This feature is common to all cost reimbursement contracts. No fee is paid to the contractor under a pure cost contract.

This contract is most commonly used for research and development work with educational or other non-profit institutions.

Cost Sharing Contract

This type of contract also does not provide for a fee payment to the contractor. In addition, the reimbursement of allowable costs is limited to a predetermined percentage stated in the contract.

The cost sharing contract is used where the potential commercial benefits accruing to the contractor through his joint endeavor with the government in a particular research or production activity offsets the need for full reimbursement of his expenses.

Cost-Plus-a-Fixed-Fee Contract (CPFF)

This contract provides for the payment of a specified dollar amount fee in addition to all allowable costs. The amount of the fee is fixed and the actual costs incurred in the performance of the contract do not change it. The fee may be adjusted only as a result of changes in the work to be performed which are initiated subsequent to the signing of the basic contract.

The fee for research, experimental and developmental type work is prohibited by law to exceed 15 per cent of the estimated costs. With but

minor exceptions, the maximum statutory fee for other works under this contract type is 10 per cent of estimated costs. By regulation, however, the Department of Defense has limited these fees to a maximum of 10 per cent and 7 per cent, respectively.

This contract type is appropriate where the nature of the work to be performed generates extremely low confidence cost estimates. The financial risk in such a situation is so great that contractors would be unwise to accept any part of it and therefore the government must assume it all.

Cost-Plus-Incentive-Fee Contract (CPIF)

This contract type utilizes a target cost, target fee, and a fee adjustment formula. In addition, both minimum and maximum fees are determined. Upon completion of the contract, the fee adjustment formula is applied to the total actual costs to determine the contractor's fee. Actual costs falling below targeted costs result in a higher-than-targeted fee, and vice versa. In no case, however, may the final fee fall outside the negotiated maximum and minimum limits.

It is appropriate to use this contract type where the range of cost estimates is large but no so large as to justify use of a cost-plus-fixed-fee contract and where there is a reasonable basis to assume that the contractor can control, through efficient management, a significantly large portion of the total costs.

Complex forms of this contract employ multiple incentive provisions, as previously explained under fixed-price incentive contracts.

Other Contracts

In addition to the aforementioned contracts, there are other types referred to as time-and-materials, labor-hour, and open contracts. These are of minor importance both to the overall procurement picture and to the subject matter of this paper; therefore, no discussion of their nature or application is deemed necessary.

Major Contrasts

At the outset of this chapter the distinction between fixed-price and cost-reimbursement contracts was stated to be in their compensation features. A further distinction should now be evident. Under a fixed-price contract the vendor is required to provide the government with the product or service regardless of the actual costs incurred in completing the contract. On the other hand, no such liability exists under a cost-reimbursement contract. The contractor's obligation ends when actual costs coincide with the estimated or targeted costs regardless of the degree of contract completion. In practice, additional funds are usually made available to allow for completion.

Fixed-price contracts require definite specifications and reasonably accurate cost information. The contractor bears the greater part of the financial risk and comparatively little administrative control is exercised by the government.

In contrast, cost-reimbursement contracts are used where the specifications are not firm and accurate cost information is unavailable.

Other Circuits

In addition to the above-mentioned circuits, there are several other circuits which are not shown on the drawings. These circuits are well known to those skilled in the art and need not be described in detail.

Operation

The operation of the above-described circuits is as follows:

Assume that the machine is in the normal condition for starting the operation of the machine. The operator inserts a card into the card feeding mechanism. The card feeding mechanism feeds the card to the card reading mechanism. The card reading mechanism reads the information punched in the card and transmits the information to the machine. The machine then performs the operation indicated by the information punched in the card.

The operator then removes the card from the card reading mechanism and inserts another card into the card feeding mechanism. This operation is repeated for each card to be processed.

The financial risk is borne by the government and therefore it exercises significant administrative control through the close surveillance of the contractor's cost and performance.

Incentive Contracts

The major contract types lend themselves to another classification based on the incentives offered to the contractors to control cost, improve performance and/or better delivery schedules. The contracts which offer no incentives are:

1. Cost-Plus-Fixed-Fee
2. Fixed-Price with Provisions for Retroactive Price Redetermination after Completion (Type E)

Those contracts which provide incentives are listed in descending order of the magnitude of incentives offered:

1. Firm-Fixed-Price
2. Fixed-Price with Provisions for Prospective Price Redetermination at Stated Intervals (Type A)
3. Fixed-Price with Provisions for Escalation
4. Fixed-Price-Incentive
5. Cost-Plus-Incentive-Fee.

From the preceding discussion of contract types it can be readily seen that the CPFF and the FPR(E) offer no incentives to the contractor to improve performance in any manner. His fee is either predetermined, as in the case of a CPFF contract, or based on actual costs (up to the

established ceiling) under an FPR(E) contract.[1] Outstanding performance on the part of the contractor does not improve his profit position.

It may be argued that these contracts offer an incentive for poor performance in certain situations. A contractor with a backlog of orders insufficient to maintain the present level of activity might be tempted to stretch out the contract in order to have it absorb a greater amount of overhead charges or to keep his employment level high in order to maintain his competitive position for future contracts.

In contrast, the profit potential of a contractor operating under one of the incentive contracts can be measurably affected by his overall performance.

The firm-fixed-price contract obviously offers the greatest monetary incentive since cost underruns accrue to the contractor as increased profit while cost overruns decrease his profit or even result in losses. The fixed-price redeterminable at stated intervals contract is analogous to a continuing series of firm-fixed price contracts and therefore offers the same incentive The fixed-price contract with provisions for escalation removes from the profit or loss calculation only those costs which are largely uncontrollable

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[1] The terms profit and fee are generally used interchangeably in any discussion of contracts. There is a distinction, however, which the reader should be aware of. Fee is used in connection with cost reimbursement contracts. Those expenses incurred in connection with the contract but determined by the government to be unallowable would be deducted by the contractor in calculating his actual profit.

and most likely to change. It, too, offers much the same incentive as a firm-fixed-price contract.

The fixed-price-incentive and the cost-plus-incentive-fee contracts provide a sliding scale of profit through the price adjustment formula. The fixed-price-incentive contract offers the greater performance incentive since larger profits are awarded for superior performance and losses may result from poor performance. The cost-plus-incentive-fee contract awards a higher fee for superior performance, but the size of this fee is limited, in comparison with that under a fixed-price-incentive contract. Poor performance results in a much smaller fee, or in rare instances no fee, not in a loss.[1]

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[1]The exception is where the size of the fee is insufficient to cover the unallowable expenses incurred under the contract. In any case the potential loss is minimal as compared to a fixed-price-incentive contract.

CHAPTER III

NEW APPROACHES

During the past few years, several major innovations in procurement methods and policy have been made. This chapter will discuss these changes and their supporting rationale.

The Need for Change

During the recent past, the United States experienced a rapidly expanding and changing technology coupled with the need for the development of complex weapons systems. The entire pattern of future warfare was seen to be altered. Advances were required in technological areas theretofore considered to be of little practical value. Missiles and electronics were overtaking aircraft as the major hardware item.[1]

A greater portion of the procurement dollar had to be devoted solely to research and development. By 1959, 31 per cent of the total expenditures on aircraft and missiles was applied to this category. The rapidity of technological breakthroughs generated many changes in defense plans. Defense contractors could no longer expect to combine relatively low-cost research and development activities with long-term production runs. The financial

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[1] In 1953 missiles and electronics accounted for 12 per cent of the procurement dollar. By 1961 this had increased to 52 per cent.

CHAPTER 6

NEW DEVELOPMENTS

risk involved in undertaking a large-scale research and development program without any assurance of a production contract became prohibitive. The government's overriding requirement for a strong military posture, however, called for greater effort in this area.

These factors precluded any accumulation of reasonably accurate pricing data on which to negotiate contracts. Contractors demanded and received the protection of cost-plus-fixed-fee contracts. The growth of cost-plus-fixed-fee contracts as a percentage of total dollar awards during this period was phenomenal, approximately doubling from 1955 to 1961, when it reached a peak of 38 per cent of the total procurement dollar.

As might be anticipated, many large cost and schedule overruns were experienced. An Air Force study of 171 cost-plus-fixed-fee contracts with an aggregate estimated cost of $3,900 million incurred actual costs of $4,600 million, or an average of 18 per cent overrun.[1]

In an independent study of 12 of the most advanced and highly complex major weapons systems, the investigators concluded that the average actual costs of development were 320 per cent of the original estimates and delivery schedules slipped by an average factor of 1.4 times.[2]

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[1] Hearings before the Procurement Subcommittee of the Committee on Armed Services, U. S. Senate, 86th Congress, 2d Session, Feb. 8-9 (Washington: U. S. Government Printing Office, 1960), p. 271.

[2] Merton J. Peck and Frederic M. Scherer, The Weapons Acquisition Process: An Economic Analysis (Boston: Division of Research, Graduate School of Business Administration, Harvard University, 1962), p. 22.

These studies and similar ones left little doubt that new methods were necessary to bring about efficiency and economy in defense procurement. This task became the responsibility of the Honorable Robert S. McNamara when he took the oath of office as Secretary of Defense in January, 1961. The remainder of this chapter will concern itself with the major changes made to the procurement process during the past four years.

Program Definition

Experience had shown that contractors, under the pressure of competition, tended to underestimate the cost and time for developing an operational weapons system and overestimated its performance capabilities. Numerous contractors, in response to the government's solicitation for proposals, submitted lengthy explanations of their approach to the problem. More often than not, these individual proposals were so diverse and lacking in specifics that it was impossible for government procurement personnel to properly evaluate them. The contract awarded under such circumstances frequently lacked a precise definition of the task and frequently substantial time and money were expended before a basic fallacy in the selected approach was uncovered.

Program definition is aimed at eliminating these deficiencies. In a word, it is contracted planning. Those contractors who have demonstrated the competence and ability to manage successfully the development program under consideration are awarded fixed-price program definition contracts. These are of a short-term nature, usually six months or less.

The product of these contracts is information on which to judge the overall technical and financial feasibility of the program and the selection of the prime contractor, if warranted. The data given in the Figure on the succeeding page are representative of the scope and nature of the information to be delivered by the individual firms under a program definition contract. Program definition, therefore, has as its major purpose the conversion of the vast store of complex technical information and forecast of military requirements into a sound, orderly, and manageable program plan.

Presently the program definition requirement is limited to those projects whose combined estimated costs for research, development, test, and evaluation exceed $25 million. The Department of Defense, however, encourages the informal application of program definition principles to smaller programs on a limited detail and selective information basis.

Incentive Contracts

In June 1961 the Secretary of Defense in his address to the National Security Industrial Association, Joint Industry-Defense Department Symposium, stated:

> I have great faith in the efficiency of the profit motive. I believe we have not yet allowed enough scope for it in our procurement policies. I am prepared to give full support to appropriate profit ratios for truly effective and efficient performance by contractors. [1]

The concluding address to this symposium was delivered by the Honorable Thomas D. Morris, Assistant Secretary of Defense (Installations

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[1] Address delivered at NSIA-DOD sponsored symposium on "The Profit Motive and Cost Reduction," June 15-16, 1961, Washington, D. C.

Figure

Partial List of Information To Be Included in Contractors' Final Reports under Project Definition

1. A list of each of the end items required for operation and maintenance.
2. Performance specifications for each of the end items.
3. PERT/Cost program plan for the development of all items contained in the system or subsystem on which the contractor bid, indicating events that interface with the work of other contractors.
4. A recommended plan for maintenance of the system based upon maintenance and logistics concepts established by the department.
5. The work breakdown structure for the development program as a whole.
6. Detailed cost estimates for the entire program derived from PERT/Cost.
7. A milestone schedule derived from or consistent with PERT/Cost networks.
8. Time-cost-performance trade-off decisions which have been made with respect to subsystems and components.
9. Foreseeable technical problems, proposed solutions, including backup efforts if necessary.
10. Other problems that cannot be defined or resolved during PDP.
11. Technical specifications and performance requirements for system and subsystem support, including personnel training, logistics, spare parts, documentation, facilities, training equipment, and so on.
12. Proposed schedule of production engineering and production tooling with relation to the development program, if appropriate.
13. Contractor suggestions as to the specific features of an incentive contract.

* - Adapted from Incentive Contracting Guide (1963), p. i.

and Logistics). He spoke as follows:

> . . . I feel it is mandatory that we increase our use of all present incentive type contracts. There are very few situations in which there is not opportunity to employ performance incentives, value engineering, or a combination of these. Over the long run, a company's incentive to earn more is the keystone of its effort to produce better products at lower prices.

Time has proven these words to be prophetic. During 1963 the shift to incentive contracts reduced the volume of cost-plus-fixed-fee contracts to 20.7 per cent of the total dollar awards. Present planning calls for a further reduction to 12.3 per cent during 1965.

The previously mentioned studies of contractor performance under cost-plus-fixed-fee contracts pointed out the major weakness of this procurement approach. Contractors, being guaranteed reimbursement, overemphasized product performance at the expense of time and cost. This was a natural tendency since the contractor by bettering performance parameters improved his probability of a production order.

The underlying principle of incentive contracts is that contractors will be spurred by the profit motive to meet or better performance, time, and cost criteria or, where these elements are in conflict, make the optimum trade-off decision among them from the standpoint of the government.

Evaluation of Contractor Performance[1]

In August 1963, the Department of Defense announced that all contractors thereafter engaged in major development projects would be evaluated

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[1]For a complete discussion of this subject, see Department of Defense Guide to the Evaluation of the Performance of Major Development Contractors (Washington: U. S. Government Printing Office, 1963).

on the basis of performance under each contract.[1]

The past performance of each contractor is now purported to be a major consideration in the award of new contracts. This evaluation has as its objective providing the contractor with a strong motivation for continued excellent performance over the long run.

The military project manager is responsible for making the initial evaluation of the contractor's performance. The contract terms relating to cost, time, and product performance are the prime standards which are to be applied to actual performance. The Contractor Performance Evaluation Group, established within each military department and consisting of procurement, legal, scientific, and engineering personnel, reviews each evaluation. If the group considers it appropriate, it may conduct an independent investigation of performance at the contractor's plant.

Upon completion of the review, a report is submitted to the contractor for his examination. Should a disagreement exist, the contractor states his position by appending written comments. The military project manager and the departmental evaluation group review the contractor's comments and if there is a strong divergence of opinion, the evaluation group has the option of conducting another field investigation.

The rather elaborate check and re-check procedures are designed to counterbalance the possibility of an unfair evaluation.

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[1]Performance evaluation is applicable to development contracts which exceed $5 million in a single year, or a total cost of $20 million.

[1]

The complete evaluation report, including the comments of all parties concerned, is forwarded to the Contractor Evaluation Office of the Department of Defense. Here it is reviewed for completeness and conformity to established directives. After this review the information is stored in a data bank and is available for use in evaluating bidders in subsequent competition.

Contractor evaluation is aimed also at providing short-run incentives under cost-plus-fixed-fee and cost-plus-incentive-fee contracts. Experience has shown that under both contract forms, competition has increased the tendency to be over-optimistic in quoting cost, time, and performance figures. Since the targeted figures in these contracts become standards against which performance is to be matched, there should be less inclination on the part of contractors to continue this practice.[1] In this sense the contractor's evaluation reinforces the planning requirement imposed by program definition.

PERT

Program Evaluation and Review Technique (PERT) is a management device designed to facilitate the planning and control of major development programs. Initially the technique was applied to schedule control only (PERT/time); however, the outstanding results achieved under this application of PERT led to its adoption as a cost control technique (PERT/cost), as well.

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[1] "Contractor Evaluation Comments Asked," Aviation Week and Space Technology (April 15, 1963), p. 32.

All program definition contracts now require contractors to submit detailed time and cost estimates derived from the PERT technique. Contractors awarded development contracts must also periodically report to the cognizant agency their actual performance as contrasted with their PERT planned performance. Most contracts contain incentive clauses which call for the accomplishment of specific events at given times (milestones) during the term of the program.

Although a lengthy discussion of the technique is beyond the scope of this paper, a brief examination of its principles and methods should provide an appreciation of its value as a control device.

The starting point under PERT is a detailed definition of objectives. Once defined, the project is broken down into work activities. An activity is a unit of work within the responsibility of a single operating unit required to complete a specified task. The time required for performance of each activity is estimated and plotted in network form which portrays the sequence of work to be performed and the interdependencies involved. The result is a series of various paths from the beginning to the end of the project.

The longest time path through the network controls the schedule and is therefore termed the "critical path." A delay in this path creates a delay in the entire project. The remaining paths are called "slack paths."

If the period required to complete the project exceeds the available time, an analysis is made as to whether activity times can be shortened or initially planned sequential activities can be performed concurrently. When

the time required by the critical path is shortened to less than a slack path, that slack path becomes critical. The analysis is continued until the desired completion date is met.

A schedule is then prepared and labor and material costs are estimated.[1] The costs are reviewed for the purpose of eliminating, where possible, overtime charges, premium payments on materials, etc. Elimination of overtime is accomplished by rescheduling of activities in the slack paths to periods when the manpower skills are not required by the critical activities. The knowledge of the quantity and schedule of consumption of materials aids in determining economic order quantities and avoids any premium payments to suppliers for filling rush orders. In all but relatively simple projects, a computer is used to accomplish the calculations.

As the project progresses, periodic comparisons are made between actual times and costs and their original estimates. This serves to identify any potential overruns in time and/or costs early enough for management to take corrective actions.

This planning and control technique is considered to be advantageous to both the contractor and the government.[2] For industry it imposes a rigid discipline for considering all elements of effort and the interrelationships required to accomplish the objectives. For the government it provides

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[1] A comprehensive treatment of this cost phase is given in the DOD and NASA Guide PERT Cost (Washington, D. C., 1962).

[2] PERT Coordinating Group for Government Agencies, PERT Guide for Management Use (Washington, D. C., 1963), pp. 8-9.

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[1] [illegible]

[2] [illegible]

visable proof that a detailed planning job was accomplished. For both it provides a common means of communication in all phases of the program.

CHAPTER IV

CONFLICTS

At the present time there are numerous conflicts between contract regulations and administrative practices on the one hand, and the overall long-run objective of securing the most defense per government dollar on the other. This chapter will analyze some of the more obvious of these.

Government by Contract

Chapter I enumerated several laws which are concerned primarily with social and economic objectives and yet have a direct impact on procurement efficiency. An examination of the requirements imposed on government contractors by the Small Business Act will serve to illustrate this problem.

To comply with the spirit of this Act, the Department of Defense established the Defense Subcontracting Small Business Program. The objective of this program is to encourage wider participation on the part of small business in government contracts.[1] The Armed Services Procurement Regulation was revised to give the Department regulatory authority over the large contractors in the administration of the program.

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[1] Small business firms for purposes of this program are those employing fewer than 500 personnel and having gross sales of less than $15,000,000.

CHAPTER IV

CONCLUSION

The so-called "Small Business Sub-Contracting Clause" is now inserted in every contract of any consequence. Compliance with this clause imposes heavy financial burdens on the prime contractors and even their large subcontractors, and full amount of this must ultimately be absorbed in the price paid by the government.

The contractor subject to the clause must actively solicit bids from small business for all subcontracts and purchase orders exceeding $10,000. This entails maintaining up-to-date records of the names of all small business firms certified by the government as competent to perform a given task. Since the number of these firms is generally substantial for most types of subcontracted work, the total amount of responses to any bid solicitation is great. The time required to analyze these bids as to costs and schedules is correspondingly large and therefore expensive.

The record-keeping responsibility of the contractor subject to the clause is also significant.[1] Full substantiation and an acceptable explanation are required when small business concerns are not solicited or when they are solicited but not awarded the contract. In some contracts the government agency's approval is required before the placing of subcontracts of $10,000 or more if small business is not to be solicited.

Make-or-buy decisions on the part of the contractor require the concurrence of the Small Business Administration.[2] When the contractor is

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[1] Cuneo, op. cit., p. 246.

[2] ASPR 3-902.

not regularly engaged in manufacturing the particular item, he is prohibited from making it in-house if other firms can provide the item at a cost no higher than that of the contractor.

Contractors must accept as factual the Certificate of Competency issued by the Small Business Administration since new small business firms do not have a trade reputation. What would appear to be a solid capability to undertake a given type of work before the subcontract is awarded may not materialize during the actual manufacturing process. In one instance, a small business firm, certified to be competent, failed to meet the delivery schedule for aircraft bomb racks. The schedule slippage exceeded three months and resulted in storage rather than delivery of nearly forty aircraft. The cost to the government for storage was $900 per month per aircraft. The impact on military readiness was significant in this case.[1]

The "Utilization of Concerns in Labor Surplus Area" clause, derived from the same act, imposes equally difficult administration problems upon contractors. When these requirements and those generated by other laws, regulations, and administration policies based solely on social and economic motives are viewed as a whole, efficiency in procurement is seen to be unattainable.

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[1]The author was personally involved in this and several other instances of inadequate performance by small business subcontractors while assigned to duty at a prime contractor's plant.

Incentives and Renegotiation

The purpose of incentive contracts is to encourage outstanding performance on the part of the contractor, as the better the performance, the higher the profits. In contrast with this policy of the Department of Defense, there presently exists an independent government agency which has the power to rescind these profits. This is the Renegotiation Board established under the Renegotiation Act of 1951.

The principal objectives of the board are: (1) to ensure that fair pricing prevails in government procurement; and (2) to prevent companies from making excessive profits. The total annual profits of the contractor are the concern of the board and not profits under specific contracts. No distinction is made, therefore, between profits made under cost-plus-fixed-fee and incentive-type contracts.

There are no statutory definitions of what constitutes excessive profits. The law requires only that the following factors be considered:

Efficiency of the contractor. --Favorable consideration must be given to the "efficiency of the contractor . . . with particular regard to the attainment of quantity and quality production, reduction of costs, and economy in the use of materials, facilities, and manpower."

Reasonableness of costs and profits. --Consideration must be given to the "reasonableness of costs and profits, with particular regard to volume of production, normal earnings, and comparison of war and peacetime products."

Capital employed. --Consideration must be given to "the net worth, with particular regard to the amount and source of private and public capital employed."

Extent of risk assumed. --Another factor requiring consideration is "the extent of risk assumed, including the risk incident to reasonable pricing policies.'

Contribution to the defense effort. --This consideration pertains to "the nature and extent of contribution to the defense effort, including inventive and developmental contribution and cooperation with the government and other contractors in supplying technical assistance."

Character of the business. --Consideration must be given to the "character of the business, including source and nature of materials, complexity of manufacturing techniques, character and extent of subcontracting and rate of turnover."

Consideration and evaluation of these factors involves personal judgment on the part of the board members and their decisions are necessarily arbitrary. So long as the Renegotiation Board operates under these nebulous guidelines it will remain a barrier to a truly effective incentive program.

With program definition, PERT/Cost and the legal requirement that contractors certify the accuracy of their pricing data, a strong case can be made for the elimination of renegotiation of incentive contracts during peacetime. All of these ensure fair pricing to the government and since its savings are substantially greater than the contractor's increased profits, it is better

to encourage larger profits than to discourage them through renegotiation proceedings.

Negative Incentives

Proprietary data is defined by the Armed Services Procurement Regulation as:

> . . . data providing information concerning the details of a contractor's secrets of manufacture such as may be contained in but not limited to its manufacturing methods or processes, treatment and chemical composition of materials, plant layout and tooling, to the extent that such information is not disclosed by inspection or analysis of the product itself and to the extent that the contractor has protected such information from unrestricted use by others. [1]

In practice this has been interpreted to mean that any information that can be gained through inspection and engineering analysis (reverse engineering) is not proprietary. Furthermore, the government's mere assertion that certain information can be obtained by reverse engineering, regardless of the time and effort required to do it, places such information in the non-proprietary category. [2]

The Armed Services Procurement Regulation also defines two classes of product information generally required by the services when procuring military hardware. Operational data include the information necessary for instruction, operation, and maintenance. Descriptive data are defined as those which provide descriptive or design drawings or

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[1] ASPR 9-201(b).

[2] Cuneo, op. cit., pp. 94-95.

specifications which, although not including proprietary data, "may nevertheless be adequate to permit manufacture by other competent firms."

Operational and descriptive data are considered to be non-proprietary. Because of the broad interpretation of what is non-proprietary information, the data contain, in most instances, as a result of the pressure exerted by the buyer, sufficient technical data to permit competitors to reproduce the item.

While this practice might be defended in instances where the government fully funded the necessary research incident to production, it cannot be justified in instances where products have been developed through wholly or partially funded company research.

In the pursuit of short-run economies, government procurement personnel provide several firms with this information and then request competitive bids for production contracts. Two recent examples of this technique are the awarding of the Bullpup air-to-ground missile and a missile target drone production contracts to Maxson Electronics Corporation.[1]

The Bullpup was developed by the Martin Company and the target drone by Beech Aircraft Corporation, both largely through company-funded research. The Maxson Corporation does not engage in research to any significant degree and therefore does not have to plan to recapture the

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[1]William J. Coughlin, "The History Lesson," Missiles and Rockets, October 26, 1964, p. 46.

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overhead incurred by this activity in its bids for production contracts. Naturally, the Maxson Corporation underbid the original developers and was awarded both contracts.

Practices like this tend to discourage research on the part of aerospace companies. If this trend continues, it will mean that all military research will necessarily be wholly funded by the government since the financial risk incurred by a contractor will far outweigh the potential profits.

There is no guarantee that the government will gain even in the short run by pursuing the policy of awarding a contract to the lowest bidder when the original research was done by another firm. During pilot production and testing, many changes are made to the developing company's design and specifications. Because of one reason or another, some of these changes are never recorded on the original engineering drawings and specifications. The contractor winning the award may produce the item according to the information provided, but there is no guarantee that the final product will be as satisfactory as that of the original vendor. When unsatisfactory results are obtained, the government must bear the additional expense for corrective action, since the vendor has met all contract requirements. Engineering and production experience, although not susceptible to quantitative measurement, should be given considerable weight before a decision is made to solicit competition.

Evaluation Effectiveness

In the previous chapter the process of contractor evaluation was explained in some detail. Although the record-keeping and investigative functions are new, the underlying purpose is merely to determine the business reputation of a firm. The effectiveness of this device is dependent on the manner in which the government employs it.

If the government does not impart sufficient importance to past performance in selecting contractors for major programs, contractor evaluation will have no value as an incentive device. Only if contractors can perceive a direct relationship between past performance and future awards will this procedure prove to be useful.

Past performance as an element of consideration in the awarding of contracts is not new. Reputation has always been a factor in source selection but never a significant one. Studies by Peck and Scherer have pointed out that greater emphasis has been given the technical attractiveness of the concept and design of the project and to the engineering, managerial, and physical resources available than to past performance.[1]

In a typical selection involving ten firms, ten out of a possible hundred points were assigned for weighing past performance. Nine competitors received nine or ten points and one received eight. Such weighting and distribution of points encourages a firm seeking a new program to place

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[1]Peck and Scherer, op. cit., pp. 362-374.

emphasis on the factors which are more heavily weighed rather than on performance reputation.[1]

In his exhaustive study of this subject, Scherer concluded that the correlation between past performance and the success the individual firm has in acquiring new contracts is slight. He found only two instances since the beginning of World War II in which unsatisfactory performance resulted in a loss of market position. In his words:

> Willingness and ability to adapt over time to major changes in weapons technology appear to have been much more significant determinants of survival in defense contracting than good performance at any moment in time. This finding has most important incentive implications. Competitive survival in the face of rapidly changing technology demands that contractor management give first priority not to achieving good performance in ongoing programs, but to moving into promising new fields and thereby developing company capabilities for winning programs of the future. The emphasis on long run survival leads . . . to inadequate managerial attention to current programs. . . .[2]

The reason for selecting contractors on the basis of past performance is to provide companies with a long-run incentive. In any particular source selection the aim is to achieve the best technical approach to the program, subject to certain financial and time constraints. These objectives, therefore, are not always in harmony. Since awards have been based primarily on factors other than the past performance, it would seem logical for

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[1] Frederic M. Scherer, The Weapons Acquisition Process: Economic Incentives (Boston: Division of Research, Graduate School of Business Administration, Harvard University, 1964), pp. 69-70.

[2] Ibid., p. 80.

contractors competing for new programs to assign their most capable personnel to applied research and preparation of proposals rather than to managing current programs. The emphasis placed on technical factors in source selection is therefore in opposition to objectives of the contractor evaluation program.

The contractor evaluation program also assumes a strong correlation between past and future performance. Some evidence has been gathered which makes such an assumption subject to doubt. Sometimes contractors do perform successively satisfactory jobs. In other cases, a satisfactory job is followed by a poor one, which in turn is followed by a satisfactory one, etc. There is some evidence in these latter instances to indicate that when a firm performs poorly in one program, it devotes considerable effort to the subsequent contract in order to ensure success. Likewise, it is sometimes evident that when success is achieved in one program there is a tendency toward complacency in a subsequent program and a general unwillingness to adopt new methods developed through advanced technology.[1]

In view of the evidence to date it appears that contractor evaluation will not provide a substantial long-run incentive to contractors. Two major points support this conclusion. First, factors other than past performance are and should be the major determinants of source selection. It is not in the best interests of defense to accept an unattractive proposal merely because the contractor has proven he can accomplish the task. Secondly,

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[1] Ibid., p. 89.

[1] Ibid., p. 84.

it cannot always be assumed that past performance is indicative of future performance. Military decision makers are aware of this fact and therefore will most likely continue to treat it as a minor consideration.

The Reverse Incentive Contract

Although in theory cost-plus-incentive-fee contracts should encourage contractors to keep their costs low, in practice, the exact opposite may be the case. This dichotomy between theory and practice is a result of the government's practice of pricing individual contracts on a full absorption basis while individual contractors are concerned with maximizing total profits on all contracts over a given time period. An example of how contractors may profit by overrunning their targeted cost will clarify this situation.[1]

Assume that a cost-plus-incentive-fee contract is awarded on the basis of the following cost breakdown:

Engineering labor	$ 5,000
Engineering overhead @ 150%	7,500
Manufacturing labor	10,000
Manufacturing overhead @ 200%	20,000
Materials	2,955
Subtotal:	$45,455
G. and A. @ 10%	4,545
Total cost:	$50,000
Target fee:	3,500
Target price:	$53,500

The maximum and minimum profits are set at $5,500 and $1,500, respectively, and the profit adjustment formula is 80%/20%. For each

[1]The material in this section has been largely derived from Bruce Backe's "Low Fees May Undermine Incentive Goal," Aviation Week and Space Technology, January 11, 1965, p. 69.

$1,000 reduction in cost below the target, the contractor receives an additional $200 fee.

Should the contractor reduce actual costs to $40,000, he would gain the maximum profit of $5,500, representing a fee of 13.75 per cent. On the other hand, if he overruns the targeted price by $10,000 for a total cost of $60,000, his fee would be $1,500, or only 2.5 per cent of cost. On the surface this would appear to be a fair agreement for both parties.

The government profits by $16,000 if the contractor performs the work for a cost of $40,000, even though the fee percentage is nearly twice that targeted. For the contractor, however, it is better to resort to the overrun of $10,000 since, as stated previously, the contractor is concerned with his total profit picture rather than profit on a specific contract.

Table 2 shows the combination of the cost-plus-incentive-fee contract and the remainder of the contractor's business under the condition of a maximum incentive fee of $5,500. In this situation his total profit is $105,000.

A contractor viewing the situation presented in Table 2 can take measures to improve the profit picture. By increasing the direct expenses of the cost-plus-incentive-fee contract, but holding the line on overhead and general and administration expenses, his total profit picture changes substantially. This may be done by keeping unneeded labor at work on the job and even buying materials at higher than necessary prices.

TABLE 2

COST-PLUS-INCENTIVE-FEE CONTRACT -- MAXIMUM FEE

	CPIF Contract	Remainder of Contractor's Business	Contractor's Total Business
Engineering labor	$ 3,000	$ 100,000	$ 103,000
Engineering overhead @ 150%	4,500	150,000	154,500
Manufacturing labor	8,000	200,000	208,000
Manufacturing overhead @ 200%	16,000	400,000	416,000
Materials	4,864	100,000	104,864
Subtotal:	$36,364	$ 950,000	$ 986,364
G. & A. @ 10%	3,636	95,000	98,636
Total Cost:	$40,000	$1,045,000	$1,085,000
Sales price	45,000	1,145,000	1,190,500
Profit:	$ 5,500	$ 100,000	$ 105,500

Since the government would allow the added overhead and general and administrative contract elements to be recovered at the negotiated rates, even though they are not spent, the total overhead recovered would go up. The net result of this course of action is shown in Table 3.

The technical complexities of the program which originally led to the selection of a cost-plus-incentive-fee contract would make it extremely difficult for government auditors to determine whether or not these costs are necessary.

TABLE 3

COST-PLUS-INCENTIVE-FEE CONTRACT -- MINIMUM FEE

	CPIF Contract	Remainder of Contractor's Business	Contractor's Total Business
Engineering labor	$ 5,000	$ 100,000	$ 105,000
Engineering overhead	7,500	147,000	154,500
Manufacturing labor	12,000	200,000	212,000
Manufacturing overhead	24,000	392,000	416,000
Materials	6,045	100,000	106,045
Subtotal:	$54,545	$ 939,000	$ 993,545
G. & A.	5,455	93,181	98,636
Total Cost:	$60,000	$1,032,181	$1,092,181
Sales price	61,500	1,145,000	1,206,500
Profit:	$ 1,500	$ 112,819	$ 114,319

By increasing the allowable overhead and general and administration expense by $12,819 on the cost-plus-incentive-fee contract, the contractor has reduced by an equal amount the same expenses required to be recovered by his remaining business. He has, therefore, increased his total profit by $8,819. The government, on the other hand, now pays out $61,500, an increase of $8,000 above the target price and $16,000 above the incentive price.

The post-contract audit of distributed overhead would recover some of the money for the government. The portion is dependent on the percentage of the total dollar value of contracts that are cost-reimbursement

types. If, in the example, the cost-plus-incentive-fee contract was the only cost-reimbursement contract, then the actual recoverable indirect cost would be calculated as follows:

$$\text{Engineering Overhead} = \frac{154,500}{105,000} = 147\%$$

$$\text{Manufacturing Overhead} = \frac{416,000}{212,000} = 196\%$$

$$\text{General \& Administrative} = \frac{98,636}{993,545} = 9.9\%$$

When these rates are applied at the final settlement, the total price to the government becomes $60,753 and the contractor's profit for the period is reduced by $747, which still is far less than his additional profit of $8,819 that was made by operating inefficiently.

One method of eliminating this reverse incentive is to use a profit adjustment formula which would increase the contractor's share of savings by an amount greater than he would receive in overhead reimbursement. Using the initial estimated figures, the indirect expenses are calculated to be 64 per cent of the total cost. For simplicity's sake, it is assumed that the separate direct costs will maintain their estimated ratio with total direct costs throughout the term of the contract. While this forecast is not precise, it is close enough for practical purposes.

Under these circumstances, if the contractor is to be provided with a positive incentive, the profit adjustment formula must call for the contractor's share in underruns to be greater than 64 per cent. At exactly 64 per cent, his total profit picture does not change as a result of his

performance, as shown by Table 4.

TABLE 4

PROFITS AT VARIOUS PERFORMANCE LEVELS

(64% Contractor - 36% Government Sharing)

	CPIF Contract	Remainder of Contractor's Business	Total Business
Cost	$40,000	$1,045,000	$1,085,000
Profit	9,919	100,000	109,919
Selling Price:	$49,919	$1,145,000	$1,194,919
Cost	$50,000	$1,038,581	$1,088,581
Profit	3,500	106,419	109,919
Selling Price:	$53,500	$1,145,000	$1,198,500
Cost	$55,000	$1,035,081	$1,090,081
Profit	0	109,919	109,919
Selling Price:	$55,000	$1,145,000	$1,200,000
Cost	$60,000	$1,032,181	$1,092,181
Profit	(-2,900)	112,819	109,919
Selling Price:	$75,100	$1,145,000	$1,202,100

Another approach to solving this problem lies in the direct costing of contracts. Under this method the contractor's estimated fixed and variable costs would be separated. The government would negotiate a fair price for the contribution that a particular cost-plus-incentive-fee contract should

make toward fixed costs. The government would also agree to pay all variable contract costs and the contractor's fee would be tied to his ability to hold down variable costs. Cost-plus-incentive fee contracts written in this manner would eliminate the reverse incentive.

Inflexibility and Multiple Incentives

Multiple incentive contracts are designed to encourage the contractor to produce a satisfactory item at a reasonable cost and within certain time limits. Cost, time, and performance, however, are not independent variables but in most instances are directly related to each other. For example, the delivery date may be advanced through the incurrence of overtime or increased manpower costs, or performance may be improved by delaying the delivery date so that newly developed subsystems may be installed.

The negotiation of a multiple incentive contract is a lengthy and tedious process. When the final profit determination formula is agreed upon, it becomes the standard against which the contractor, during the term of the contract, will evaluate trade-off alternatives. These decisions are based on the priorities assigned each variable by the government. In theory, decisions made under a multiple incentive contract should be advantageous from the government's standpoint.

There are indications, however, that this is not a fact. The parameters initially established and made an integral part of the contract are always subject to change. A technological breakthrough, for example, may permit use of better subsystems and components, or intelligence agencies

may modify their assessment of the enemy's potential threat. Flexibility is therefore not only a desirable characteristic of a contract, but also a necessary one.

The Department of Defense has recognized the problem imposed by multiple incentives, as quoted in the Incentive Contracting Guide:

> . . . a successful incentive arrangement demands that the need for supplemental agreements be minimized. A too-heavy incidence of changes, modifications, and misunderstandings during contract performance will severely damage the effectiveness of the incentive provisions, and, in addition, impose a heavy administrative burden on both the government and the contractor. Thus the contract must leave no doubt in the mind of either party as to precisely what is required and what steps will be taken to meet the requirements. And this can be accomplished only if the business and technical aspects of the procurement are carefully and completely planned in advance.[1]
>
> . . . . . .
>
> . . . it is not easy to derive a multiple incentive matrix wherein the most profitable trade-off decision for the contractor will always be coincident with the decision DOD would prefer. In fact, as conditions change during the contract performance, the interrelation between incentive elements may also change; and a relative weighting pattern that was suitable when the contract was awarded may be less satisfactory at a later time.[2]
>
> . . . . . .
>
> One of the most difficult problems in the administration of contracts that contain incentive provisions is negotiating equitable adjustments in the contract price (target cost and target fee) and/or delivery schedule that result from contract changes. Changes are troublesome enough under contracts that do not contain incentive provisions, when only the price or fee and delivery schedule are at issue; the problem is compounded under the simplest type of cost incentive arrangement, when the effects of the change not only on target costs and fee, but also on the maximum and minimum fees, the sharing formula, and the confidence range must be determined. . . . Introduction of a second incentive--for example, delivery--

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[1] U. S. Department of Defense, Incentive Contracting Guide (Washington: U. S. Government Printing Office, 1962), p. 9.

[2] Ibid., p. 43.

> complicates the process of adjudicating the change. Completing the triangle, a change in performance incentives is perhaps the most complex, and in combination with the other parameters, poses grave problems. [1]

Knowing that technical and strategic uncertainties are characteristic of any weapons development program, attempts to completely plan in advance all business and technical aspects of a program appear unrealistic. [2]

When detailed decision parameters are placed in the body of the contract, changes brought about through external forces will either lead to "grave problems" and "heavy administrative burden" or worse, discourage program modification which would be acceptable on technical, financial, or strategic merits. [3]

Multiple incentives, then, introduce the undesirable element of inflexibility in weapons development programs.

It might be argued that the parameters can be changed to fit the current situation. Modification, however, is not an overnight process. Like the development of the original parameters, it is a lengthy process which requires the participation by high-level technical and program management personnel. Personnel whose time could best be spent on administering the project.

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[1] Ibid., pp. 48-49.

[2] Scherer, op. cit., p. 180.

[3] The 1963 revision to the Incentive Contracting Guide mentions the complexity of revising multiple incentive contracts but does not use the stronger language appearing in the 1962 version. The problem has not changed, however--only the statement of it.

[illegible], loc. cit.

[illegible], op. cit., p. 156.

[illegible] was created by the Economic Stabilization Act of 1942 to control prices, rents, wages, and salaries. The provisions of the act were temporary, however, and were not renewed in the 79th Congress. The provisions have not changed, however, since the enactment of 8.

Another consideration is the decision-making parameters to be used by the contractor during the period when the original ones are being re-evaluated. Decisions based on the original parameters might be detrimental to the procurement agency; however, these are the only existing ones and, from the contractor's standpoint, those which determine his profit.

It appears that the solution to the problem of multiple incentive contracts lies in removing the several parameters from the contract itself and replacing them with the single constraint of cost. Since cost is invariably affected by other elements, the government retains most of the control it has had under the multiple incentive contract. A separate document could be used to inform the contractor of the priorities that the government assigns to each element and would be the standard against which the contractor's performance would be measured.

This method would provide for flexibility. The contractor would be aware that his performance is being evaluated against known standards, and he is subject to a definite cost constraint. When a change is introduced, the cost constraint is changed to effect it. During the interim period when new parameters are being developed, the contractor would base decisions on the cost constraint which, while not necessarily perfect, does measurably control the interacting variables.

The recommended method is not an optimum solution to maintaining complete control together with full flexibility. The approach, however, appears right and should be the subject of further inquiry by the government.

Opposing Standards

Cost reduction is not the result of pure chance. Contractors may spend considerable funds in seeking ways to reduce costs through improved management information systems, manufacturing methods, etc. Wider use of incentive contracts should encourage cost reduction efforts since the contractor stands to participate in the savings. Whether or not this will come about is dependent on the actions of contracting officers.

One of the unwritten but accepted standards for evaluating a contracting officer's performance is the percentage of profit paid on a contract. Traditionally the fees paid on cost-plus-fixed-fee contracts have been limited, by design or otherwise, to the very narrow range of 6 to 7 per cent. The exceptions to this are considerably rarer than could be accounted for by chance. The same unwritten standard, if applied to incentive contracts, will weaken their effectiveness.

An example will be helpful in developing this point. Assume that a contractor, through a company-funded program, manages a significant cost reduction. Instead of the targeted fee of 7 per cent, he earns 10 per cent. The additional 3 per cent does not, however, recover all the costs incurred in developing the cost reduction program. If, during the follow-on contract negotiation, the contracting officer adheres to the unwritten standard and sets a target of 7 per cent using the past actual cost as a base, the incentive for improving performance will be destroyed. He must take into account that the contractor incurred additional costs to improve performance

and that he anticipated recovering these costs plus a profit for so doing. Subsequent contract terms which are designed to lower the contractor's profit to the traditional level will eliminate the contractor's interest in generating further improved performance.

The Defense Department must be willing to support contracting officers who permit comparatively high profits. Since profits represent only a small portion of the total price paid by the government on any one contract, the emphasis, therefore, should be placed on cost, not profit, reduction.

CHAPTER V

FINDINGS

Public Interest

There is no question that the government "regulates" the defense industry. This regulation, like those of railroads and public utilities, is considered to be in the public interest. Unlike these other business activities, however, there is no independent regulatory commission before which the interested parties can present their case. The regulation is unilateral and accomplished through law, regulations, and, to some extent, administration policy. These laws, regulations, and policies are established not only to protect the public purse but also to carry out social and economic objectives. The burden placed on the defense industry in compliance with many of the laws not directly concerned with increasing procurement efficiency is a heavy one. In such an environment the defense industry cannot be expected to act with the drive, efficiency, and flexibility that characterize private enterprise.

An unknown cartoonist illustrated the situation with a caricature of the defense industry as a mule carrying the heavy load of the small business program, geographical distribution of contracts, and labor surplus requirements. The mule is also tied down with ropes labeled: incremental funding, Buy American, PERT, security requirements, and program definition. A carrot called incentive hangs in front of the mule, but most of it has broken

off as a result of unallowable costs and renegotiation. Is it any wonder that the mule doesn't move?

These conflicts have arisen from the piecemeal approach followed in formulating procurement laws and regulations. The problem can be solved by viewing it as a whole and not separate and independent parts. A comprehensive study of the laws and regulations influencing procurement should be undertaken. This government study should have as its purpose the determination of the relative value of each of these as contrasted with its detrimental effect on procurement efficiency. Those laws and regulations designed for social or economic motives that do not offset in the broader picture the added burden imposed on procurement should be eliminated. Until this approach is taken, true efficiency will remain largely a myth.

Long-run Incentives

With the one exception of contractor performance evaluation, the present incentive system is tied to the short-run situation. Contractor performance evaluation, however, is not necessarily effective over the long run. History shows that contractors are selected on the basis of the technical and financial attractiveness of their proposals and their capacity to undertake the program. Past performance is relevant only when competitive proposals are equally attractive.

Past performance has furthermore been shown to be, at best, a very unreliable indicator of future performance, and government procurement personnel are well aware of this fact. In consideration of these factors, it

seems most unlikely that the contractor performance evaluation program will be a long-run incentive of measurable significance.

The present short-run incentives written into each contract are also of questionable value. As shown in the previous chapter, the cost-plus-incentive-fee contract can actually act as a reverse incentive to incur overruns. The same reverse incentive can encourage the contractor to incur costs up to the established ceiling even under a fixed-price-incentive contract.

The problem arises from the fact that government procurement personnel attempt to minimize the costs over the short-run term of the contract while contractors are generally interested in maximizing profits over the long run. The objectives of both parties are in opposition. Stronger long-run incentives would eliminate most of the potential for reverse incentives.

One possible solution to this problem is negotiating contracts for more than a single year; this would require a change in the present law which states that aircraft missiles and ships shall be procured on an annual basis.

Multi-year contracts would prevent the practice by contracting officers of lowering targets based on the previous year's performance. This improvement alone should encourage intensive cost reduction efforts.

Studies by Scherer have pointed out that poor performance seldom affects the market position of a defense firm. A reluctance to strongly penalize firms with unsatisfactory performance records, despite the overcapacity of the industry, points up the fact that the strongest long-run incentive, that of survival, has not been used.

If firms which consistently performed unsatisfactorily were not awarded contracts and therefore forced out of business, it would serve as a powerful reminder to others that their continued existence was strongly tied to their long-run performance.

Adoption of direct costing to pricing government contracts would also eliminate reverse incentives. By relating the government's contribution to the firm's fixed costs directly to past performance, and basing profits on control of variable costs, the contractor would be simultaneously operating under both long- and short-run incentives.

Exception to Renegotiation

As long as incentive contracts are subject to review by the Renegotiation Board, the contractor has no substantial incentives to achieve superior performance. He is constantly faced with the prospect that beyond a point, unknown to him, the profits earned under such contracts will not only be taken away, but he will simultaneously incur the heavy costs incident to the renegotiation process.

In view of the extensive safeguards provided by the pre-award process, the need for review of incentive contracts is questionable. At the very minimum, the uncertainty of what constitutes excessive profits under incentive contracts should be eliminated. Specific criteria should be established and at a profit level sufficiently high to encourage defense firms to take full advantage of the incentive contract provisions.

Conclusion

There are many dichotomies in the laws, regulations, and policies affecting procurement and the fundamental objective of obtaining the most defense for the dollar. The more evident of these discrepancies have been pointed out in this study and general approaches to their solution have been recommended. In a word, they call for improving the incentive system.

Profit incentives have been invaluable in the development of private industry. If administered properly by the government within a reasonable regulatory environment, they offer the best hope for achieving desired procurement goals. The only alternative to effective profit incentives may well be further government control, an alternative which could be socially and economically dangerous.

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